



CHAPTER 1

Dell™ PowerVault™ 56F 16-Port Fibre Channel Switch User's Guide

The Dell PowerVault 56F is a 16-port Fibre Channel switch that consists of a removable system board with gigabit interface converter (GBIC) modules, front panel controls with a liquid crystal display (LCD) for configuration, redundant power supplies, hot-swappable fan pack, and firmware for building and managing a fabric. A *fabric* is an active, intelligent, and nonshared interconnect scheme for Fibre Channel server and storage nodes. One or more switches interconnected create a Fibre Channel fabric. Figure 1-1 shows the switch view of a PowerVault 56F.

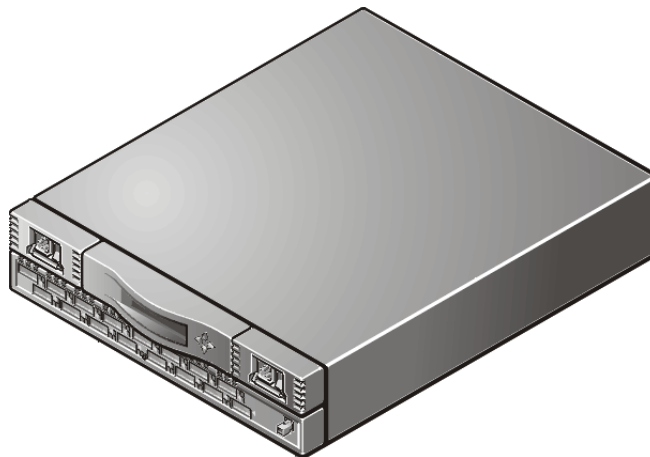
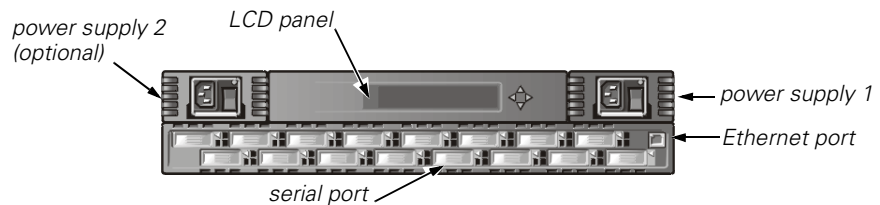


Figure 1-1. PowerVault 56F

PowerVault 56F 16-Port Fibre Channel Switch Features

The switch includes the following features:

- Ability to perform initial setup, including setting up the switch's Internet Protocol (IP) address from the front panel controls.
- GBIC modules support fiber and copper transmission media. The switch's modular construction gives the switch a range of flexibility in creating, upgrading, maintaining, and configuring a fabric.
- Integrated multifunction application-specific integrated circuit (ASIC) devices are used throughout the switch.
- Design does not require microprocessor data path interaction, resulting in a worst-case data transfer latency of less than 2 microseconds from any port to any port at peak Fibre Channel bandwidth of 100 megabytes per second (MB/sec). The latency may differ when the destination or device is a loop.
- Virtual channels allow the switch to use congestion management techniques that are performed automatically by the switch.
- The switch's firmware allows discovery of all connected devices and determines optimum data paths without intervention.
- The switch interoperates with the PowerVault 51F. If compatibility mode is enabled on the PowerVault 56F switch, it can also interoperate with the PowerVault 50F.
- Switch ports support E_Port, F_Port, and FL_Port modes of operation with the software selecting the optimum mode of operation.

Performance

A minimum aggregate routing capacity of 8,000,000 frames per second is specified for Class 2, Class 3, and Class F frames. Non-blocking throughput of up to 16 by 100 MB/sec end-to-end is provided.

A maximum switch latency of less than two microseconds is specified for Class 2, Class 3, and Class F frames when the output port is free.

Manageability

You can perform initial configuration of the switch from the front panel controls. You can also manage the switch remotely via Telnet, the Switch Manager, or Dell OpenManage™ products.

Modularity

The modularity built into the switch allows:

- Support of 16-unit (U) universal ports
- GBIC interface support of different transmission media for each port

Reliability

The switch has the following features, ensuring reliability:

- Power-on self test (POST)
- Error monitoring
- Temperature and fan-speed monitoring
- Low component count
- Optional redundant power supply
- Redundant fans

Serviceability

The switch has the following features, enhancing serviceability:

- Simple enclosure
- Loopback test modes for service
- Hot-pluggable fans and power supply
- No jumpers or switch settings

System Components

Components are enclosed in an air-cooled chassis that may be either mounted in a standard rack or used as a stand-alone unit. The front panel has controls with an LCD that you can use to view status or configuration, and an RJ-45 Ethernet connector that allows you to manage the switch remotely.

Switching Function

The switching function is based on a central memory bank associated with its data path control. Each switch port stores received frames in this memory, passing a buffer pointer to the forwarding port's transmitter. The switch uses *cut-through* routing to route frames from the receiving port to the transmitting port, providing the transmit port is free, without waiting for the end of the frame to be received. This provides a low-latency data path within the switch. The frame can be temporarily stored in the memory bank but only if the transmit port is busy.

Universal Ports

The switch is manufactured with 16 universal ports (U_Ports). U_ports provide the greatest amount of flexibility when building a fabric because the ports automatically and dynamically configure themselves to operate in E_Port, F_Port, or FL_Port mode during port installation. The ports negotiate from the FL_Port to the higher-performing F_Port if the attached device supports both modes.

Embedded Port

The embedded port, which is a logical N_Port, is based on a microcontroller and is responsible for:

- Fibre Channel link control
- Switch management
- Routing table management
- Address assignment and management functions
- Management of Class F services and the related protocols as defined in the Fibre Channel Standard

The embedded port also functions as a Simple Network Management Protocol (SNMP) agent, a Fibre Channel name server, and an alias server to manage multicast and broadcast functions.

System Firmware

Included with the switch is firmware that can be customized and tuned for each installation. Dell has provided a standard set of commands and interfaces described in “PowerVault 56F Commands” of the *Dell PowerVault 56F 16-Port Fibre Channel Switch Installation and Troubleshooting Guide* for switch monitoring, control, and management.

SWL Fiber-Optic GBIC Module

The short-wave laser (SWL) fiber-optic GBIC module is based on short wavelength 850 nanometer (nm) lasers supporting 1.0625 gigabytes-per-second (Gbps) links speeds. This GBIC module supports 50-micrometer and 62.5-micrometer multimode fiber and is supported only in non-Open Fibre Connection (OFC) mode. 50/125-micrometer cables up to 500 meters (m) in length and 62.5/125-micrometer cables up to 175 m in length are supported.



NOTE: The SWL GBIC module uses a Class 1 CD laser, which complies with the 21 CFR, subpart (J) as of the date of manufacture.

LWL Fiber-Optic GBIC Module

The long-wave laser (LWL) fiber-optic GBIC module, which has a blue color-coded subscriber connector, is based on long wavelength 1300-nanometer (nm) lasers supporting 1.0625-Gbps link speeds. This GBIC module supports 9-micron single-mode fiber. You can use cables up to 10 kilometers (km) in length with a maximum of five splices. The GBIC module is shipped with a protective plug in place; keep the plug in place if no fiber-optic cable is connected to the port.



NOTE: The LWL GBIC module uses a Class 1 CD laser, which complies with the 21 Code of Federal Regulations (CFR), subpart (J) as of the date of manufacture.

Copper GBIC Module

The copper GBIC module is based on the High-Speed Serial Data Connection (HSSDC) interface standards. The GBIC provides a female HSSDC connector.

HSSDC-to-HSSDC cables of 6 and 12 m have been qualified. Standard cables with HSSDC-to-DB9 male connectors are also available in lengths of 3, 6, and 12 m.

Hot-Pluggable Power Supplies

The switch has a universal hot-pluggable power supply capable of functioning worldwide without voltage jumpers or switches. The power supply auto-ranges to accommodate input voltages and line frequencies.

The power supply has a modular design that plugs directly into the enclosure through the front panel, attaching to an internal connector. The switch also supports a second redundant hot-pluggable power supply.

The power supply has an integrated on and off switch, input filter, and power indicator.

